CLAIMS:

1. An electroluminescent device (10) biasable to produce electroluminescence and comprising an electroluminescent porous silicon region (22) and electrical connections to the porous silicon region (24, 26, 28, 20), characterized in that electroluminescence from the porous silicon region is detectable when the device is biased such that a current having a current density of less than 1.0 Am^{-2} flows through the device (10).

2. An electroluminescent device according to Claim 1, characterized in that electroluminescence is detectable when the device is biased such that a current having a current density of less than 0.1 Am^{-2} flows through the device.

3. An electroluminescent device according to Claim 2, characterized in that electroluminescence is detectable when the device is biased such that a current having a current density of less than 0.01 Am^{-2} flows through the device.

4. An electroluminescent device according to Claim 3, characterized in that electroluminescence is detectable when the device is biased such that a current having a current density of less than 0.0001 Am^{-2} flows through the device.

5. An electroluminescent device according to Claim 1, characterized in that the device is biasable to produce electroluminescence with an external quantum efficiency greater than 0.1%.

6. An electroluminescent device according to Claim 1, characterized in that the device is biasable to produce electroluminescence with an external quantum efficiency of at least 0.4%.

7. A solid state electroluminescent device (10) comprising an electroluminescent porous silicon region (22) and electrical connections to the porous silicon region (24, 26, 28, 20), characterized in that the device is biasable to produce electroluminescence from the porous silicon region with an external quantum efficiency greater than 0.01%.

8. An electroluminescent device according to Claim 7, characterized in that the device is biasable to produce electroluminescence with an external quantum efficiency greater than 0.1%.

9. An electroluminescent device according to Claim 7, characterized in that the device is biasable to produce electroluminescence with an external quantum efficiency in the range 0.01% to 0.18%.

10. An electroluminescent device according to Claim 7, characterized in that the device is biasable to produce electroluminescence with an external quantum efficiency of at least 0.4%.

11. An electroluminescent device according to Claim 7 comprising a luminescent porous silicon region and electrical connections to the porous silicon region, characterized in that the porous silicon region incorporates a p-type porous silicon region (930, 950) and an n-type porous silicon region (960) having a p-n junction (970) therebetween.

12. An electroluminescent device according to Claim 11, characterized in that the device comprises:

i) an n-type bulk silicon region (910),

ii) an n-type porous silicon region adjacent the n-type bulk silicon region (960),

iii) a p-type porous silicon region (930, 950) adjacent the n-type porous silicon region, and

iv) electrical contacts (920, 26, 28) to the bulk silicon region and the p-type porous silicon region.

13. An electroluminescent device according to Claim 1 or Claim 7 characterized in that the device is operable to produce a modulated light output, modulatable at a frequency of 1 MHz.

14. An electroluminescent device according to Claim 1 or Claim 7 characterized in that the device is encapsulated.

15. A method of fabricating an electroluminescent device including the steps of:

a) implanting a surface region of a silicon wafer, doped with a donor impurity to render the wafer n-type, with an acceptor impurity such that the surface region has a volume concentration of the acceptor impurity which is greater than a volume concentration of the donor impurity;

b) anodizing the wafer under illumination to produce a luminescent porous silicon region extending through the surface region; and

c) depositing an electrode on the porous silicon region;

characterized in that the surface region has a sheet resistivity greater than 100 $\Omega\square^{-1}$ immediately prior to the anodizing step.

16. A method of fabricating an electroluminescent device including the steps of:

a) implanting a surface region of a silicon wafer, doped with a donor impurity to render the wafer n-type, with an acceptor impurity such that the surface region has a volume concentration of the acceptor impurity which is greater than a volume concentration of the donor impurity;

b) anodizing the wafer under illumination to produce a luminescent porous silicon region extending through the surface region; and

c) depositing an electrode on the porous silicon region;

characterized in that less than 1% of the acceptor impurity is electrically active prior to the anodizing step.

17. A method of fabricating an electroluminescent device including the steps of:

a) implanting a surface region of a silicon wafer, doped with a donor impurity to render the wafer n-type, with an acceptor impurity such that the surface region has a volume concentration of the acceptor impurity which is greater than a volume concentration of the donor impurity and at least a part of the region has an acceptor impurity volume concentration comparable with the solid solubility limit of the acceptor impurity in silicon;

b) anodizing the wafer under illumination to produce a porous silicon region extending through the surface region; and

c) depositing an electrode on the porous silicon region.

18. A method of fabricating an electroluminescent device including the steps of:

a) implanting a surface region of a silicon wafer, doped with a donor impurity to render the wafer n-type, with an acceptor impurity such that the surface region has a volume concentration of the acceptor impurity which is greater than a volume concentration of the donor impurity;

b) anodizing the wafer under illumination to produce a luminescent porous silicon region extending through the surface region; and

c) depositing an electrode on the porous silicon region;

characterized in that the silicon wafer does not receive an anneal between steps (a) and (b).

19. A method of fabricating an electroluminescent device including the steps of:

a) implanting a surface region of a silicon wafer, doped with a donor impurity to render the wafer n-type, with an acceptor impurity such that the surface region has a volume concentration of the acceptor impurity which is greater than a volume concentration of the donor impurity;

b) anodizing the wafer under illumination to produce a luminescent porous silicon region extending through the surface region; and

c) depositing an electrode on the porous silicon region;

characterized in that the anodization step causes surface doping of silicon quantum wires within the porous silicon region, rendering the surface doped quantum wires p-type.

20. P-type porous silicon, characterised in that the porous silicon has a porosity greater than 30%.

21. Substantially wholly microporous visibly luminescent porous silicon, characterized in that the porous silicon is derived from n-type bulk silicon.

22. An electroluminescent device comprising a porous silicon region and electrical connections to the porous silicon region, characterized in that the porous silicon region contains a p-n junction therein.

23. An electroluminescent device comprising a porous silicon region and electrical connections to the porous silicon region, characterized in that the porous silicon region is a wholly microporous visibly luminescent region fabricated from n-type bulk silicon.